MARINE GENETIC RESOURCES IN AREAS BEYOND THE LIMITS OF NATIONAL JURISDICTION

The regulation of commercial utilization and conservation of marine genetic resources in areas beyond the limits of national jurisdiction

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Contents

1 Introduction

1.1 Theme and main issue

The primary aim of this thesis is to describe and analyse the regulation that exists with regards to the commercial utilization and conservation of marine genetic resources situated in areas beyond the limits of national jurisdiction. Secondly, a de lege ferenda discussion will be presented.

The first focus of this thesis will be on the commercial utilization of marine genetic resources found in areas beyond the limits of national jurisdiction rather than for example access to these resources. It is not the fact that the resources are investigated or researched, but the commercial element of the utilization of the resources that is the issue. The term *utilization* is defined here as the activity of extracting or capturing value from marine genetic resources.[1] This understanding implies that when describing and analyzing the regulation of the commercial utilization of marine genetic resources a discussion is triggered of the activity related to the resources, often called bioprospecting, and its regulation.

Conservation of marine genetic resources is the second focus. The concept and term *conservation* shall for the purpose of this thesis involve the long-term preservation, protection or sustainable use of the natural environment, ensuring that ecosystem integrity can be maintained and thereby maintaining genetic diversity of all marine life therein.

This thesis deals with the marine areas that extend beyond the limits of national jurisdiction and shall in the context of this thesis include both the seabed and the water column above it on the high seas. The deep seabed or the abyssal plain relevant to this discussion is the area

[1] Tvedt, M.W. 2006, p. 6.

regulated under the United Nations Convention on the Law of the Sea (UNCLOS) as the International Seabed Area (the Area).[2]

The issues of commercial utilization and conservation of marine genetic resources found in areas beyond the limits of national jurisdiction are relatively new issues that currently are highly debated in different arenas such as the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (UNICPOLOS) and, the Ad Hoc Open-ended Informal Working Group of the General Assembly to study issues relating to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction (AHOEIWG).[3] Marine genetic resources will also be a topic for the United Nations resolution on oceans and the law of the sea this year, and a meeting of the AHOEIWG will most likely be held in 2008 to consider genetic resources beyond areas of national jurisdiction.[4]

The conservation and commercial utilization of marine genetic resources brings about both technical and more ideological legal issues that are intriguing, vital and that demand clarification as a result of different states' attitude towards the issue. There is therefore a pressing need for legal practitioners to contribute to the debate, and this thesis is such a contribution to the ongoing discussions.[5]

1.2 An introduction to marine genetic resources and bioprospecting

Governance of marine resources is about more than just fish. Genetic resources found in marine areas beyond the limits of national jurisdiction are also of interest. To illustrate the complexity of the resource, marine genetic resources are found virtually everywhere in the marine sphere, for example within seaweed on the seabed or jellyfish in the water column. Commercially interesting genetic resources have for example been found in or close to

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[2] UNCLOS Article 1 (1)(1).

[3] United Nations, Division for ocean affairs and the law of the sea, http://www.un.org/depts/los/index.htm.

[4] UN A/62/169, p. 1 and UN A/61/222 paragraph 91.

[5] UN A/61/65 Annex I, Summary of trends prepared by the Co-Chairpersons, paragraph 11.

hydrothermal vents, coral reefs and other marine features. Biological material, such as microbial resources comprising 95 % of the biomass in the ocean, and that contain functional units of heredity, are also of interest.

An example of commercial utilization of marine genetic resources is a sunscreen product where genetic information captured from the genome of a deep seabed organism has contributed to an improved UV filter.[6] The genome being defined as the full complement of genetic information that an individual organism inherits from its parents and especially the set of chromosomes and the genes they carry.[7]

The activity that initiates and enables the commercial utilization of marine genetic resources, called biological prospecting or bioprospecting does not enjoy a commonly accepted legal definition. The Encyclopaedia of Biodiversity defines bioprospecting as the

> *... systematic search for genes, natural compounds, designs, and whole organisms in wild life with a potential for product development by biological observation and biophysical, biochemical, and genetic methods, without disruption to nature.*[8]

This definition can help to delimit the term bioprospecting. The focus on product development is especially relevant. It differs from marine scientific research, which primarily is seen as purer research and not commercial.[9] A note prepared by the Executive Secretary before the Convention on Biological Diversity Conference of the Parties in Nairobi May 2000, defined bioprospecting as

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[6] NewScientist.com, Deep-sea bugs produce super sunscreen, http://www.newscientist.com/article.ns?id=dn1503. Visited November 8th 2007.

[7] Biology-Online.org, http://www.biology-online.org/dictionary/Genome. Visited 14 Nov. 07.

[8] Mateo, N., W. Nader, G. Tamayo, 2001, p. 471.

[9] Arico, S. and C. Salpin, 2005, p. 15.

... the exploration of biodiversity for commercially valuable genetic and biochemical resources. It can be defined as the process of gathering information from the biosphere on the molecular composition of genetic resources for the development of new commercial products.[10]

Both definitions state that bioprospecting entails a commercial element, and both also focus on the commercial *intention* of the researcher to explore the resources and not on the *actual* commercial utilization of the genetic information. This approach may constitute a regulatory challenge when marine scientific research is done with a pure scientific intention and then a commercially valuable resource is found and a product developed from it. This latter approach will then fall outside the scope of the definitions of the term bioprospecting even if the same factual commercial utilization takes place. This also illustrates that it might be difficult in practice to differ between marine scientific research and bioprospecting. This furthermore illustrates that regulation of access to the resources while not regulating the commercial utilization of the resources found may create difficulties.

The two definitions cited above give a general picture of what different attempts on definitions on bioprospecting enshrines. For the purpose of this thesis bioprospecting can thereby be said to entail the search for, analysis of and product development from genetic material for commercial use.

1.3 Values and threats

Large-scale commercial interest in relation to genetic material in the deep sea and on the deep seabed has only been a theme since the mid-1980s.[11] This is however an area that is blooming and stakeholders, especially from biotechnical businesses, are now expressing an

[10] UNEP/CBD/COP/5/INF/7.

[11] Arico, S. and C. Salpin, 2005. For further reading on values and valuation of genetic resources, see: Tvedt, M.W. and T. Young, 2007, Chapter 5, and Tvedt, M.W., 2006, pp. 9-11, and Romstad E. & G. Stokstad, 2005.

interest.[12] The unsuspected, high biological diversity of the deep sea floor, which is where much of the potentially valuable genetic material is found, was first discovered in the late 1960s.[13] The reason for the commercial interest is amongst others that it is

> *... estimated that approximately 98 per cent of known marine species live in benthic environments and that more species live in benthic environments than in all the other environments on earth combined. Most of these species are still unknown.*[14]

Diversity of species in benthic environments, which can be understood as relating to the bottom of a sea, implies diversity of potentially valuable genetic material.[15] Consequently, because specific abilities within genetic materials are needed for different purposes, the broader the genetic diversity, the more opportunities will be available for biotechnological and other areas of use. Genetic diversity has thereby a value.

Historically, the focus in relation to the ocean floor has not been on marine genetic resources, but on minerals, liquid and solid. Polymetallic nodules have been of interest because they contain commercially important substances like nickel, copper, cobalt and manganese.[16] However, the high depths these mineral resources have been discovered at have contributed to a low commercial interest and harvesting has therefore not happened on a full-size, commercial scale. The fact that the commercial interest in mineral resources of the Area has been limited by practicalities has also contributed to lower interest in marine genetic resources because the knowledge of the ocean floor and all the resources therein has been generally scarce.

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[12] Arico, S. and C. Salpin, 2005, p. 27.

[13] UN A/61/__ Oceans and the law of the sea. Paragraph 10.

[14] A/59/62/Add.1 Para. 169.

[15] Biology-Online.org, http://www.biology-online.org/dictionary/Benthic_Region. Visited 13 Nov. 07.

[16] Churchill, R.R. and A.V. Lowe. 1999, p. 223.

On the basis of the economic prospects that were seen in the seventies UNCLOS, the Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 with annex (the Agreement Relating to the Implementation of Part XI of UNLCOS) and other agreements now regulate mineral resources. Even though minerals are a different kind of resource, their regulation is interesting because it can provide ideas as to how marine genetic resources could be regulated.

Today, sciences such as biotechnology and gene technology use genetic resources in their work. These technologies contribute to solving health and agriculture related challenges amongst others in important and valuable ways. Marine genetic resources are, however, in some cases vulnerable. Interesting marine genetic resources are often found in flora or fauna that grow slowly and, which are often endemic i.e highly restricted to a small, localized are.[17] The conservation of genetic diversity can therefore be justified through both commercially-oriented and protection-focused reasoning. It is, on the other hand, important to keep in mind that it is the genetic information and knowledge found in the genetic resources that are of interest. In some cases only a small sample will be needed to explore the resource and serious impact on the marine environment can be avoided, also making bioprospecting a sustainable use of the resources.

Marine scientific research or bioprospecting can however also have negative implications on marine life. Hydrothermal vents are underwater active volcanoes or underwater circulatory systems driven by sub-surface volcanic activity and they are thereby in constant change and consequently less open to human manipulation.[18] Hydrothermal vents can however be destroyed if they are disturbed intensively over a short period of time or seriously physically impacted.[19]

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[17] UN A/61/__ Oceans and the law of the sea. Paragraph 11.

[18] Statement by Associate Dean of Science at the University of British Columbia, Professor Curtis Suttle at UNICPOLOS, New York, USA, 25-29 June 2007.

[19] Glowka, L. 2003, chapter 2.

Values arising from the utilization of the functional units of heredity (i.e. genes) found in marine genetic resources, such as new medicine, may constitute a conflict of interest in relation to the exploitation of living marine resources such as fish. Fishing often has a destructive impact on the seabed, cold-water corals (including deep sea corals) and other benthic communities that may create general marine ecosystem deficiencies in these areas and thus poses a threat to genetic diversity.[20]

Marine genetic resources in flora and fauna that are vital in the production of medicines exist and there might be marine genetic resources that currently do not contribute with actual value but that in the future can be necessary in combating a deadly disease. It is therefore important to evaluate the conservation of these resources for present as well as future benefits to human health.

Examples of marine ecosystem threats that have arisen through fishing are dumping of non-target fish, so-called bycatch, and bottom trawling. Both are practices that can harm benthic communities.[21] Bottom trawling is a method of fishing that implies dragging a net with rock hoppers and trawl doors across the ocean floor to maximize fish catches. The activity can have grave implications for genetic diversity, species and the ecosystems on the seabed when the gear comes in contact with the seabed.[22]

Fishing is however important from various perspectives. Fishing creates income, wealth and work, often in poorer areas. An estimated 41 million people worked as fishers and fish farmers in 2004, the greater part of these in developing countries, predominantly in Asia.[23]

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[20] The deep-sea coral scientist statement has garnered signatures from 1452 marine scientists and biologists. The statement asks to ban bottom trawling to protect deep-sea ecosystems. See http://www.mcbi.org/what/dscstatement.htm.

[21] Probert, P. K., D. G. Mcknight, S. L. Grove. 1997. pp. 27-40.

[22] Gray J. S., P. Dayton, S. Thrush, M. J. Kaiser. 2006. pp. 840–843.

[23] FAO SOFIA report, 2006, p. 6.

Fish is also an important source of protein and in some areas the most vital source.[24] Globally, fish provides more than 2.6 billion people with at least 20 percent of their average per capita intake of animal protein.[25]

Marine genetic resources are also a value in other respects, and not only in connection to biotechnology or health. Some living banks and reefs in the oceans are up to 8000 years old and studying them can probably contribute with new knowledge.[26] The gathering of information and knowledge from marine genetic resources in order to understand the planet we inhabit and in order to find solutions to evolutionary issues can also be seen as a value.

A fact of ethical value is the reality that the resources found beyond national jurisdiction are not under any one-nation rule. What legal status marine genetic resources in areas beyond the limits national jurisdiction are afforded will therefore also imply a question of politics of wealth distribution. The answer to this question will, for example, have implications as to how values arising from marine genetic resources in this vast area are divided among nations.

Only a few nations possess the technology and financial resources to access and utilize marine genetic resources. Most of these are developed states.[27] Developing nations are then effectively excluded from accessing deep sea marine genetic resources because of the scientific level and financial resources needed to explore them. The values arising from these resources are thereby not free to all, in the sense that only some nations can benefit from them. In order to grant developing states effective access to marine genetic resources and the capacity to utilize them, there are several opportunities available. As a consequence *benefit sharing* will be discussed.

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[24] FAO SOFIA report, 2006, p. 36.

[25] FAO, SOFIA report 2004, Part 1, Fish consumption.

[26] UNEP/CBD/SBSTTA/11/11, paragraph 41.

[27] Arico, S. and C. Salpin, 2005. p. 7.

1.4 Sources of law and judicial method

The Statute of the International Court of Justice describes in Article 38 the legal sources the court shall apply when deciding such disputes as are submitted to it. The list of legal sources presented here has gathered wide adherence and can be seen as a starting point. The two main legal sources in public international law, which both are mentioned in Article 38, are international conventions and international custom. UNCLOS is, as the main written convention for the law of the sea, a natural point of departure for the matter under discussion in this thesis. Marine genetic resources in areas beyond the limits of national jurisdiction constitute a new international issue politically, as well as legally, and as such are not treated specifically in global treaties. On the international legal level, genetic resources within national territories are dealt with under the Convention on Biological Diversity (CBD).

International court decisions and opinions often works as guidance in relation to the understanding of international law. The term genetic resources is, however, not used in any case decided upon by the International Tribunal of the Law of the Sea (ITLOS) or any other generally known international court. A plausible reason for this is that the issue of marine genetic resources in areas beyond national jurisdiction is relatively new, and because it might be difficult to bring a case concerning this issue to court as a consequence of the lack of specific regulation.

Because of the lack of detailed and comprehensive legal sources regulating marine genetic resources beyond national jurisdiction, this thesis must draw from related areas and their regulation; such areas include regulation relating to biological diversity, fisheries and general public international law. This implies that this thesis will draw from related material such as the CBD, UN General Assembly resolutions and reports from recognized institutions. UN resolutions and reports are not binding upon states as opposed to treaties and, in principle, customary international law that are binding, and can thus only be used as guidance.

1.5 Excepted issues and discussions

The commercial utilization and conservation of marine genetic resources has a link to many related legal areas that are not directly relevant for the discussions in this paper, but which deserve an explanation as to why they are not discussed.

The protection of the marine environment with relation to ocean dumping and other polluting practises will not be dealt with even if these types of activities can have implications for the conservation of deep sea biodiversity and genetic resources. The subject matter is globally regulated under the Convention on the prevention of marine pollution by dumping of wastes and other matter (London Convention), including its Protocol (the Protocol). The same issue is also regulated under UNCLOS. Article 194 in UNCLOS is the main provision regarding prevention, reduction and control of pollution of the marine environment. This is a general Article covering different kinds of pollution. More specified issues such as sub-seabed storage of CO2, which also can have effects on benthic communities and marine genetic diversity, is primarily discussed under the London Convention.[28] The meeting of the parties to the London Protocol has made an amendment that has been adopted in this regard.[29] The Protocol that will gradually replace the Convention bans dumping of any wastes, other than those on an approved list and thereby takes a precautionary approach. Storage of CO2 has now been added to the approved list.[30] Additionally, the Protocol includes the polluter pays principle. Even though pollution has grave effects on the seabed and organisms living in the water column, pollution is

[28] House, K.Z., D.P Schrag, C.F. Harvey, & K.S. Lackner, 2006.

[29] Amendments to the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, adopted on 2 November 2006 at the First Meeting of the Contracting Parties to the London Protocol.

[30] "CO2 streams from CO2 capture processes for sequestration" has been added to the list.

significantly different from conservation of marine genetic resources. This thesis will therefore not discuss pollution-related issues.[31]

This thesis will neither deal with bioprospecting issues in relation to the Antarctica as this area can be seen as covered by a special regime. For further reading see the report by Lohan, D. and S. Johnston, 2005, and Riffenburgh, B. (ed.), 2007.

The discussions in this thesis on marine genetic resources will deal with the resources specifically with relation to public international law and specifically the law of the sea. Marine genetic resources, ownership and rights to such, have a clear side in patent law that will not be treated here as a result of the focus on the law of the sea.

1.6 Structure

The remainder of this thesis will first, in chapter two, look at the role of UNCLOS and the CBD in relation to the issues, before marine genetic resources, as a legal concept will be identified. Subsequently the areas, where the resources are situated, will be described legally.

Thereafter, in chapter three, the different legal subjects such as businesses and states that are undertaking the activities related to marine genetic resources will be identified and discussed.

Subsequently in chapter four, the existing regulation of the legal subjects with regards to the commercial utilization and conservation of marine genetic resources will be described and analysed. This chapter will show that not all issues are regulated or that existing regulations are unclear. Chapter five will as a consequence present a de lege ferenda

[31] The issue is also regulated regionally; see the 1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircrafts, together with the 1983 and 1989 protocols amending it. For further readings see: Juda, L. 1996, and Sands, 2003, Chapter 9.

discussion in relation to new regulations, while the final chapter will present one regulatory option that could address the legal gap identified.

2 Setting the scene

2.1 The role of UNCLOS

Is UNCLOS the relevant legal framework for the commercial utilization and conservation of marine genetic resources in areas beyond the limits of national jurisdiction? Several international institutions have discussed this and found UNCLOS to be the main regulatory regime. These institutions include the Eighth Conference of the Parties to the Convention on Biological Diversity (CBD COP-8) and its Subsidiary Body on Scientific, Technical and Technological Advice.[32] In the decision of CBD COP-8, the COP

> *Recognizes also that the United Nations Convention on the Law of the Sea regulates activities in the marine areas beyond national jurisdiction…*[33]

The AHOEIWG has come to the same conclusion.[34] A preparatory document for the eighth meeting of UNICPOLOS also states that

> *… activities related to marine genetic resources is governed by the relevant general provisions of UNCLOS and are to be undertaken within its legal framework.*[35]

Paragraph 51 of the report from the eighth meeting of UNICPOLOS also states that most delegations from this meeting recognizes UNCLOS as

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[32] UNEP/CBD/COP/8/3 Recommendation XI/8.

[33] UNEP/CBD/COP/8/31 VIII/21.

[34] UN A/61/65, p. 21.

[35] UN A/62/66 paragraph 188.

...the legal framework within which all activities in the oceans and seas are to be carried out.[36]

This implies that the commercial utilization and conservation of marine genetic resources in areas beyond the limits of national jurisdiction are to be covered under UNCLOS and that this thesis consequently will use UNCLOS as the main legal source.

2.1.1 UNCLOS – the main legal source

The main treaty regulating the oceans in general is UNCLOS. The convention was signed on the 10th of December 1982 and has been ratified by 155 states.[37] During its development the interests of the seafaring nations that wanted the Grotian principle of freedom of the seas to get a key position in the regulations of sea stood head to head with states that wanted more extensive coastal state jurisdiction, which made the treaty difficult to finalize.[38]

During the third law of the sea conference, the states involved agreed upon many of the disputed subjects. The four general and fundamental issues of UNCLOS were territorial, resource exploitation, organizational and procedural issues in particular. A nationalization of what had formerly been the high seas happened through a system whereby states received sovereign rights over areas adjacent to their territory for certain matters. This extended coastal state jurisdiction came partly as a reaction to the tragedy of the commons, where a race for the fisheries resources outside the territorial sea was heating up due to more efficient fishing vessels and gear that raised the fishermen's ability to harvest more fish. The concern related to distant water fishing nations, i.e. developed states that largely exploited developing countries coastal areas, also assisted in bringing about the change.[39]

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[36] UN A/62/169 paragraph 51.

[37] As of October 26th, 2007.

[38] Grotius expressed the idea of "freedom of the seas" in Grotius, H. 1609. De Indis (Mare Liberum).

[39] Churchill, R.R. and A.V. Lowe. 1999, p. 161.

The convention is to some degree based on the 1958 Conventions that were a result of the first Law of the Sea Conference. The four treaties in question from 1958 are the Convention on the Continental Shelf, the Convention on the High Seas, the Convention on the Territorial Sea and the Contiguous Zone and the Convention on Fishing and Conservation of the Living Resources of the High Seas. The first three of these conventions were predominantly codifications of international customary law and thus many provisions in UNCLOS are based on customary international law.[40] Consequently, this means that it is one of the most accepted treaties in public international law and therefore enjoys wide adherence. The convention is also a product of the world's naval history. Conclusively the 1982 convention is the main conventional document for the law of the sea.

2.2 The role of CBD

What role does the CBD play in relation to marine genetic resources in areas beyond the limits of national jurisdiction, bioprospecting and UNCLOS? Genetic resources are clearly covered by the scope of the CBD. The three objectives of the convention affirm this, as well as Article 2 seen together with the convention as a whole.[41]

A question that arises is whether marine genetic resources in areas beyond national jurisdiction are regulated by the CBD. CBD Article 4 regulates the jurisdictional scope of the convention and states that,

Subject to the rights of other States, and except as otherwise expressly provided in this Convention, the provisions of this Convention apply, in relation to each Contracting Party:
(a) In the case of components of biological diversity, in areas within the limits of its national jurisdiction; and

[40] Churchill, R.R. and A.V. Lowe. 1999, p. 15.

[41] CBD Article 1.

(b) In the case of processes and activities, regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction.

This provision implies that the *components* of biodiversity only are covered by the CBD within the limits of national jurisdiction, while *processes and activities* are also covered in the area beyond the limits of national jurisdiction.[42] The ordinary meaning of the term *component* is; a part of a larger whole.[43] This would imply that the genetic resources, as being components of biodiversity, only fall under the scope of the convention within the limits of national jurisdiction. A genetic resource outside the limits of national jurisdiction is thereby not in itself covered by the CBD.

A natural understanding of the term *processes* implies a series of incidents, changes or happenings, while the term *activities* can be understood as something being done. It is the processes and activities that the marine genetic resources can be affected by that are covered beyond the limits of national jurisdiction by the CBD. The search and gathering of biological material, which is the part of bioprospecting that takes place out on the ocean, can be seen as an activity. Bioprospecting is thereby an *activity.*

In conclusion, the CBD does not regulate marine genetic resources in ocean space beyond national jurisdiction, but the scope of the convention cover the commercial activity related to the resources; namely bioprospecting.

The legislative status of UNCLOS and the CBD is furthermore the same and both agreements are legally binding. As a consequence, parties to both agreements must adhere to both. The CBD Article 22 has, however, regulated the relationship between UNCLOS and the CBD. This provision states that parties to the CBD are to implement the CBD

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[42] CBD Arts. 4 (a) and (b).

[43] Paperback Oxford English Dictionary, 2001, 2002.

... with respect to the marine environment consistently with the rights and obligations of States under the law of the sea.

This implies that the provisions relevant to bioprospecting in the CBD are binding and applicable, but that they need to be implemented consistently with UNCLOS. These provisions include, amongst others, the obligation to identify and monitor processes and activities that are likely to have significant adverse impacts, the need for environmental impact assessments, and research and training.[44]

In the dynamic world of international law, many parties to the CBD and UNCLOS emphasize, as explained in the previous chapter, that UNCLOS provides the legal framework for all activities related to marine genetic resources in areas beyond the limits of national jurisdiction. This, together with Article 22 of the CBD, implies that the CBD can be seen to enjoy only a complementary role to UNCLOS. States confirm this complementary role of the CBD, as reflected in the Co-Chairpersons' list of possible elements to be suggested from UNICPOLOS-8 to the General Assembly where UNCLOS was recognized as the main framework, while the CBD was only recognized as playing an important role.[45] As a consequence of this role of the CBD as only complementary in relation to activities related to marine genetic resources, the specific provisions that can be seen as relevant will not be discussed further in this thesis.

2.3 The resources in question

The CBD Article 2 defines the term *genetic resources* as

"Genetic resources" means genetic material of actual or potential value.

The primary aim of this definition is to describe the term as it is used in the CBD. Because of the lack of other commonly accepted definitions and the acceptance through utilization

[44] CBD Arts. 7 (c), 14 and 12.

[45] UN A/62/169 Annex, paragraphs 3 and 5.

of this definition in other related affairs, such as the AHOEIWG, this definition is widely recognized.[46]

The CBD definition of genetic resources is built on the same principles as the definition of plant genetic resources given in the International treaty for plant genetic resources for food and agriculture developed under the FAO. Those principles are focusing on *genetic material with functional units of heredity* and *value* - and then combining the two elements. The fact that the same system and content is used in other treaties also strengthens the recognition of the definition as a commonly accepted one.

The definition of genetic resources in the CBD can and will therefore also be used in areas where the scope of the CBD does not reach.

The two terms *genetic material* and *actual or potential value* must therefore be interpreted to find the scope of the term *genetic resources*. *Genetic material* is defined in CBD Article 2, which states that,

> *"Genetic material" means any material of plant, animal, microbial or other origin containing functional units of heredity.*

The phrase ... *any material of plant, animal*… means any material from flora or fauna. Flora can be described as plant life, while fauna can be described as animal life. The ordinary meaning of the word *microbial* is a microscopic organism including bacteria, viruses, algae, fungi and protozoa. The term *other origin* can be interpreted in conjunction with the whole provision and the natural interpretation of the phrase to mean any other genetic material from another source. This implies conclusively that all biological material is covered by the terms.

[46] UN A/61/65. Amongst others paragraph 29.

It is, however, only the material that holds functional units of heredity that is covered by the definition of genetic material. The phrase *functional units of heredity* can be interpreted as the units must be functional in passing on genetic information. However, intact living cells, whole chromosomes, genes and DNA fragments smaller than genes can each be considered functional units of heredity under different circumstances.[47] A chromosome is a genetic structure of cells containing the cellular DNA.[48] A gene is a unit of heredity composed of DNA, whereas DNA is the material that plays a central role in the determination of hereditary characteristics, such as the structure, function and behaviour of a cell.[49]

Genetic resources have now been discussed in relation to *genetic material*, one of its two components. The phrase *of actual or potential value* will now be considered.

The definition limiting genetic resources to genetic material that has actual or potential value is not limited to one perspective of value. What values the CBD is trying to seek out, by setting up the value criterion, is difficult to pinpoint.[50] It can nevertheless be said that the phrase actual or potential value is not limited to commercial value.

When compared with the definition of *biological resources* in the CBD, it can be thought that genetic resources is not required to hold a direct value to humanity. However, as the concept of value describes beliefs of an individual or culture, it is related to humanity. This means that the term *genetic resources* includes genetic material that must hold an actual or potential value in one way or the other to humanity.

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[47] Kate, K.T. and S.A Laird, 1999, p. 18. Tvedt, M.W. and T. Young. 2007, pp. 54-55.

[48] Dictionary of biology, 1996.

[49] Dictionary of biology, 1996.

[50] Tvedt, M.W. 2006, p. 6.

The term *actual or potential value,* seen together with the term *genetic material,* can be understood as the value of the biological material, when it is used, or might be used, to take advantage of the functional units of heredity.[51]

Based on the situation where the world is progressing, technology is rapidly developing and new needs are created it would furthermore be practically impossible to limit the potential value arising from the utilization of the functional units of heredity of a certain genetic material. Based on the premise that all marine genetic material has a potential or actual value, all of it is covered by the term marine genetic resources. This is the precondition used when deciding the use of the term marine genetic resources in this thesis.

2.3.1 The term *genetic resources* in relation to UNCLOS

The Vienna Convention on the Law of Treaties (the Vienna Convention) regulating treaties between states is the primary source of law in relation to analyzing treaties. The principles found here need to be applied when discussing marine genetic resources in relation to UNCLOS because the term marine genetic resources is not used in UNCLOS. Neither are other terms used to describe marine genetic resources, such as deep sea genetic resources. Article 31 of the Vienna Convention, which represents customary international law, puts forward the general rule regarding interpretation of treaties and states that

A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.

The object and purpose of UNCLOS will therefore be of specific relevance in relation to the understanding of the term marine genetic resources and whether marine genetic resources are covered by the convention. Several terms describing different categories of marine resources under UNCLOS will thereby be discussed with the aim of discovering the

[51] Tvedt, M.W. 2006, pp. 5-6. Tvedt, M.W. and T. Young. 2007, p 55.

ordinary meaning of the terms in order to seek out whether marine genetic resources are covered by UNCLOS.

The terms *living resources*, *marine life* and *organisms* are used in UNCLOS when the convention regulates issues related to genetic resources. The terms will now be interpreted with a view to find their scopes and to find out whether the terms cover marine genetic resources. If the mentioned terms cover marine genetic resources, then the relevant provisions of UNCLOS using these terms will also be applicable in relation to marine genetic resources.

The term *living resources* is used in relation to the high seas.[52] The term is, however, not mentioned in relation to the regulation of the Area in UNCLOS. By using the system of UNCLOS that differentiates between living and non-living resources, the term *living resources* can be limited in definition to not cover mineral resources as defined by UNCLOS Article 133. This also implies that a *living resource* is still seen as being part of the category *living resources* also after it has been killed, removed from its roots or similar.

By looking at a general conservation provision in UNCLOS, Article 117, which uses the term *living resources,* it can be established that a positive definition of this term is not found here. The objective of Article 117 is also to conserve the living resources of the high seas and the provision does not contain any exceptions. The preamble of UNCLOS also contributes and uses the term *living resources* when stating the following:

Recognizing the desirability of establishing through this Convention, with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication, and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, ***the conservation of their***

[52] UNCLOS Article 117.

living resources, *and the study, protection and preservation of the marine environment, (emphasis added).*[53]

The emphasised phrase from the preamble also shows what one of the main objectives of the treaty is. Other terms such as fish or vertebrates could here have been used if the founders of the treaty wished to limit or specify the scope of the treaty more.

Fish are clearly covered by the term living resources. UNCLOS Article 61 also describes one method of fish management under the heading *conservation of the living resources*. It can be concluded from this that the term living resources cover fish.

The ordinary interpretation of the word *living* supports the understanding that the term covers organisms and all other resources that are living. The definition of genetic material in the CBD states that the material must contain functional units of heredity. Functional units of heredity or genes contain the information necessary for life to exist, and is thereby an intrinsic part of all living organisms. Genetic resources can therefore be seen as covered by the term *living*.

To bring in the interpretation of the term *resources* from the CBD, and discuss *actual or potential value* in relation to the term *living resources* in UNCLOS, would be to use an argument that was probably not intended by the writers of UNCLOS. UNCLOS was discussed during three major Conferences, whereas the third took place between 1973 and 1982. This means that the use of the term *living resources* was decided upon in this period, before the CBD had been conceived of or signed. This conclusively implies that to define something as a *resource* under UNCLOS because it has *actual or potential value* in line with the CBD would not necessarily be correct.

[53] UNCLOS Preamble fifth paragraph.

It could, however, be said that the ordinary meaning of the term *resources* in a biological frame implies that the resource must be of *natural* matter. The term natural is not defined legally, but points to the fact that the genetic resources cannot be man made, they have to exist in, or be obtained from, nature.[54] It can also be said in general that a precondition for something to be named a *resource* is that it would have to imply a value or be something that potentially can be of use in one fashion or another. This means that the ordinary meaning of the term *resource* most likely will be in line with the CBD idea on actual or potential value as a criterion differing between *material* and *resources*. On this basis it can be concluded that the term *living resources* covers the term genetic resources and that the provisions in UNCLOS that use the term *living resources* also are applicable in relation to marine genetic resources.

The term *marine life* is used in UNCLOS Article 1 (1) (4). The sentence states that,

> *...effects as harm to living resources **and** marine life,... (emphasis added)*

The word *and* implies that marine life is something more or something different to living resources. It would not be necessary to use both terms if they represented the same content. It is clear from the word *life* that the term only covers living matter, as is the case with living resources. Furthermore, it is not limited to resources, but covers all matter that is living in the marine world. The ordinary meaning of the term *marine* is; relating to the sea.[55] It can be concluded on this basis that the term marine life encapsulates all that is living and is related to the sea. As marine genetic resources are related to the sea and, as discussed above, can also be seen as living, such resources are covered by the term *marine life*.

UNCLOS also uses the term *organism*. The ordinary meaning of the term is an individual animal, plant or single-celled life form. In adopting the Cartagena Protocol on Biosafety to

[54] Paperback Oxford English Dictionary, 2001, 2002.

[55] Paperback Oxford English Dictionary, 2001, 2002.

the CBD (Cartagena Protocol), the first extraordinary meeting of the conference of the parties to the CBD adopted a definition of the term *living organism*. This definition must however, be seen in the light of its purpose, which is to establish a definition in relation to genetically modified organisms. Consequently the definition can only be used as guidance to the interpretation of the term. It defines this term as,

> *... any biological entity capable of transferring or replicating genetic material, including sterile organisms, viruses and viroids.*[56]

A virus is a parasite of living nature consisting of DNA or RNA and a protein coat.[57] RNA is a complex organic compound found in all living cells. It plays a role in transferring information from DNA to the protein-forming system of the cell.[58] It can therefore be stated that a precondition for something to be called an organism is that it must be capable of transferring or replicating genetic material. However, a genetic *resource* also needs to be of potential value and the discussion up until now has shown that something can be defined as an organism without holding value. As discussed above, most or probably all organisms have a potential value, so it can in generally be stated that the term *organism* encapsulates the term *genetic resources* even though organisms without value could exist.

From the arguments above, one could conclude that when UNCLOS uses the terms *living resources*, *marine life* or *organism* it implies that marine genetic resources are covered and that the relevant Articles in UNCLOS using one of these discussed terms are therefore also regulating marine genetic resources.

2.4 The relevant geographical areas – high seas and deep seabed

The geographical areas relevant for the issues raised in this thesis are the *areas beyond the limits of national jurisdiction*. As this phrase holds different content for different oceanic

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[56] Cartagena Protocol Article 3 (h).

[57] Dictionary of biology, 1996.

[58] Dictionary of biology, 1996.

areas, the high seas and the deep seabed, the phrase will now be explained in order to delimit the scope of the issues discussed.

2.4.1 Areas beyond the limits of national jurisdiction

The United Nations Declaration on the Human Environment (Stockholm Declaration) and the Rio Declaration on Environment and Development (Rio Declaration) that reaffirmed the Stockholm Declaration both contain the phrase *areas beyond the limits of national jurisdiction*.[59] The phrase should in the context of these agreements be understood to include more than just the oceans and its seabed; also the moon and outer space are included.

The rules defining the phrase in relation to the oceans are found in UNCLOS. States are through UNCLOS granted some jurisdiction in a belt adjacent to their coasts, named the exclusive economic zone (EEZ). This area that covers both the seabed and water column above is thereby considered as within the area of national jurisdiction.[60] The EEZ, which can be claimed out to 200 nautical miles measured from the baselines, is a *sui generis zone*, a special type of zone for particular functions. By claiming this zone, coastal states are granted,

> *... sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non living...*[61]

This implies that states are granted sovereign rights in the EEZ over marine genetic resources, as these are per definition living resources. Coastal states are thereby granted rights in relation to the commercial utilization and conservation of marine genetic resources in this area. Consequently, all parts of the water column of the sea that is not included in the EEZ, in the territorial sea, or in the internal waters of a state, or in the archipelagic

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[59] Stockholm Declaration, Principle 21. Rio Declaration, Principle 2.

[60] UNCLOS Article 56 1 (a).

[61] UNCLOS Article 56 (1) (a).

waters of an archipelagic state, are part of the area beyond the limits of national jurisdiction and a subject of this thesis.

The seabed is also subject to the phrase *areas beyond the limits of national jurisdiction*. The seabed area relevant for the purpose of this thesis is the area outside coastal states continental shelves, named the Area.[62]

All coastal states have a continental shelf that stretches out to 200 nautical miles measured from the baseline.[63] The shelf is considered as an inherent part of the coastal state and simply a natural prolongation of the land territory both in case law, customary international law and hard law.[64] Coastal states enjoy sovereign rights over the natural resources of the shelf.[65] According to the International Law Commission such sovereign rights include,

... all rights necessary for and connected with the exploration and exploitation of the natural resources of the continental shelf... (including) jurisdiction in connexion with the prevention and punishment of violations of the law.[66]

Natural resources shall here be understood as the non-living resources and certain living organisms. Under UNCLOS, living organisms under the legal regime of the shelf are limited to

... living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move

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[62] UNCLOS Article 1 (1) (1).

[63] UNCLOS Article 76 (1).

[64] North Sea Continental Shelf Cases. Brownlie, I. 2003, p. 207. The Truman Proclamation. UNCLOS Article 76 (1).

[65] Convention on the Continental Shelf, Article 2 (1). UNCLOS Article 77.

[66] ILC Yearbook, 1956, Vol. II, p. 297.

except in constant physical contact with the seabed or the subsoil.[67]

As discussed above, the term *organism* encapsulates genetic resources, and genetic resources are thereby relevant in relation to provisions concerning the continental shelf. This implies that coastal states have sovereign rights to conduct bioprospecting on the continental shelf and jurisdiction over other states connected to the activity.

The seabed might, however, stretch further out than 200 nautical miles measured from the baseline, and to a maximum of 350 nautical miles or shall not exceed 100 nautical miles seaward from a line connecting the depth of 2500 meters.[68] This implies that a coastal state has sovereign rights in relation to marine genetic resources outside its EEZ when the continental shelf stretches further out than 200 nautical miles, but only in relation to the continental shelf.

Because a coastal state's jurisdiction over the seabed might stretch further out than the EEZ, bioprospecting by another state on the high seas can, in practise, take place in the water column above a coastal state's continental shelf.

Since there exist many areas where the outer limit of the continental shelf has not yet been decided upon what comprises the Area might to some degree change. Most states must submit particulars of such outer limit of their continental shelf to the Commission on the limits of the continental shelf within the 13th of May 2009.[69] This implies legally that coastal states in the future can enjoy rights in relation to marine genetic resources in areas that today are beyond national jurisdiction.

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[67] UNCLOS Article 77 (4).

[68] UNCLOS Article 76.

[69] SPLOS/72, read with the backdrop of UNCLOS Annex II, Commission on the limits of the continental shelf, Article 4.

3 Private acts, public responsibility and private rights

When the aim is to describe and analyse the regulation of commercial utilization and conservation of marine genetic resources in areas beyond the limits of national jurisdiction, there is a need to describe the actors that are undertaking bioprospecting as well as the actors relevant to conservation.

The actors undertaking bioprospecting are mainly collaborations between private companies and public institutions or private companies with public funding, hereafter *organisations*. States' roles in this relation must therefore also be identified. The question that arises is; who are the rights and duty subjects in the areas beyond the limits of national jurisdiction in relation to the commercial utilization and conservation of marine genetic resources?

3.1 The actors' roles

Within national jurisdiction, all persons, companies or alike can be recognized as legal persons. In international law, meaning the legal system governing the relationships between nations, states are the primary legal persons.[70] Other legal entities, such as individuals, companies, non-governmental organisations and others do, as a general rule, only have status as rights subjects in the form of interest subjects. The United Nations, however, has a special status.[71]

The general structure and difference between states and persons on an international legal level can be seen in particular when looking at the rules with respect to state responsibility and the International Law Commission's Draft Articles on Responsibility of States for Internationally Wrongful Acts (Draft Articles). Persons are treated when they are acting with a connection to the state, not on their own behalf.[72] This would mean that an act relevant to a treaty, done by a person in the area beyond the limits of national jurisdiction

[70] Black's Law Dictionary, Eighth edition.

[71] ICJ Reparation for Injuries Case.

[72] Draft Articles Chapter II.

would be the responsibility of the state. This implies that it is the task of individual states to regulate bioprospecting activities and to establish regulations in relation to the conservation of marine genetic resources for its nationals.

The fact that states are both rights and duty subjects under international law, possessing international personality[73], and are the relevant subject in relation to marine genetic resources in areas beyond the limits of national jurisdiction, means that they have the

> *... capacity to make claims in respect of breaches of international law, capacity to make treaties and agreements valid on the international plane, and the enjoyment of privileges and immunities from national jurisdiction.*[74]

This structure explained in the cited text above is based on the principle of sovereignty of states. The correlation between jurisdiction and sovereignty can be used to explain the two terms. Oppenheim expresses this relationship when stating that

> *A state's "title to exercise jurisdiction rests in its sovereignty".*[75]

This implies that the legal competence that a state has can describe the term sovereignty, while the term jurisdiction is used on particular rights, liberties or powers that the state has. A state enjoys, for example, sovereignty on the landward side of the territorial sea in relation to its living marine resources, including genetic resources, while it only has jurisdiction or sovereign rights over certain issues in the EEZ such as conserving and managing living resources.[76]

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[73] Oppenheim, 1992, p. 16.

[74] Brownlie, I. 2003, p. 57.

[75] Oppenheim, 1992, p. 457. The S.S. Lotus Case, p. 19.

[76] UNCLOS Articles 2 (1) and 56.

3.2 Exclusive flag state jurisdiction

The link between a ship performing bioprospecting on behalf of an organisation and the state in question is the flag that the ship sails under.[77] The system of flag states is derived from a principle of personality, because it establishes the assumption that the ship belongs to that state, and relies on the relevant state to exercise its jurisdiction in relation to its nationals.[78] The principle of flag state jurisdiction enjoys the status as an international custom and is thereby, in principle, binding upon all states.[79]

On the high seas flag states enjoy exclusive jurisdiction, which, for example, implies that punishment of violations of the law by a person, or ship only can be carried out by the flag state or by the state of which such person is a national.[80] The International Law Commission has criticized the Lotus case that granted jurisdiction in such cases to flag states alone, and UNCLOS does also grant jurisdiction to the state where such a person is a national.[81]

On the basis of flag state jurisdiction, organisations must only adhere to the rights and obligations put on them by the state in question.[82] A ship performing bioprospecting on the high seas or on the deep ocean floor is thereby under the exclusive jurisdiction of their flag state. The jurisdiction a state holds over vessels that raises their flag can amongst others materialize through gear regulation and regulations of working conditions for the bioprospectors.

The flag state is not necessarily the same state as where the commercial benefits arising from the utilization of marine genetic resources are captured in a laboratory or later sold as

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[77] UNCLOS Article 92.

[78] Ruud, M., G. Ulfstein & O.K. Fauchald. 2003, p. 103.

[79] Churchill, R.R. and A.V. Lowe. 1999, p. 8 and Brownlie, I. 2003, p. 238.

[80] UNCLOS Article 97 (1). Oppenheim, 1992, p. 16.

[81] ILC Yearbook, 1956, Vol. II, p. 281. UNCLOS Article 97 (1).

[82] UNCLOS Article 92.

part of a product. However, as it is the process of collecting samples of biological material out at sea that is the act that starts up bioprospecting, the flag state will for the purpose of this thesis be seen as the relevant legal person in all parts of the activity bioprospecting.

Because it is the state where a ship is registered that is the relevant flag state in relation to UNCLOS and international customary law, companies have for example registered their fishing vessels in states that are not members to a relevant international agreement in order to avoid regulation of their fishing activities.[83] This issue has in particular been discussed under the heading *flag of convenience states*.[84] However as long as bioprospecting is not regulated clearly or thoroughly, organisations do not have an incentive to use this option. On the premise that some flag states have already or will unilaterally regulate bioprospecting in areas beyond national jurisdiction, a situation with convenience flagged ships might also arise in relation to bioprospecting.

The discussion above shows that states are the rights and duty subjects in relation to the commercial utilization and conservation of marine genetic resources in areas beyond the limits of national jurisdiction, and that the organisations performing bioprospecting in the area in question only have to adhere to the regulations put on them by the flag state.

3.3 Interests in marine genetic resources

Under public international law, legal persons other than states, save in relation to war crimes and alike, only have an *interest*, while states have *obligations* as well.[85] On the high seas and on the deep-ocean floor, businesses or similar entities have interests in relation to the resources found there, both mineral and living, but it is the flag state that is the relevant legal person.

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[83] Greenpeace Case Study on IUU fishing # 3.

[84] UNCLOS Article 92 (2). IPOA-IUU. 2001.

[85] Statute of the International Criminal Court, Article 1.

Organisations performing bioprospecting on the high seas and on the seabed only have an interest with respect to marine genetic resources, primarily from a commercial aspect, while it is the responsibility of the flag state to make sure that its obligations in relation to the conservation of the biological resources, for example in respect of a multilateral agreement such as UNCLOS, are upheld. However, if the international obligations on flag states are vague or general in nature, states do not necessarily have a clear incentive to regulate the activities of their nationals. The following chapter will therefore assess the regulations that exist in relation to conservation and bioprospecting of marine genetic resources in areas beyond national jurisdiction through the main regulatory framework for the law of the sea, UNLCOS.

4 Bioprospecting and the conservation of marine genetic resources

UNCLOS is primarily based on a system where different areas and activities are regulated rather that different resources. The water column and the seabed are two such areas, while amongst the regulated activities are fishing and marine scientific research. Bioprospecting and the conservation of marine genetic resources on the *high seas* and on the *seabed* will as a consequence be treated separately. First, the regulation of marine genetic resources and related activities on the seabed in the Area will be dealt with. Next, the regulatory regime in relation to the conservation of marine genetic resources on the high seas will be discussed. Finally, the regulation of the commercial utilization of marine genetic resources and the related activities on the high seas will be treated.

4.1 What legal status do genetic resources enjoy in the Area?

UNCLOS Part XI regulates the seabed area beyond national jurisdiction, called the Area.[86] The first question is whether the activity bioprospecting is regulated under the scope of this Part. In the Area, *activities* are defined in UNCLOS Article 1 (3) and are limited to

[86] UNCLOS Part XI, Section 1 and Article 1 (1) (1).

activities related to *the resources of the Area*. This means that it is only the activities that are related to the resources of the Area that are regulated. The referred to resources are defined in UNCLOS Article 133 (a),

> *"Resources" means all solid, liquid or gaseous mineral resources.*

An ordinary understanding of this implies that activities related to living resources are not regulated under Part XI regulating the Area, as only non-living mineral resources and activities related to them are covered. Bioprospecting is thereby not regulated under this Part, as it is related to marine genetic resources, not mineral resources. The question that arises is whether marine genetic resources are dealt with in the Area in relation to conservation of the environment.

UNCLOS Article 145 covers protection of the marine environment in the Area. The next question is whether marine genetic resources are covered by this provision. This provision's first passage formulates a general rule, which states that

> *Necessary measures shall be taken in accordance with this Convention with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects which may arise from such activities.*

This provision is meant to protect the marine environment, and marine genetic resources must therefore be seen as a part of the marine environment in order to enjoy protection. The term *marine environment* is not defined by UNCLOS. When assessing Article 194 of UNCLOS that also uses the term *marine environment*, the term appears to cover ecosystems, habitats, threatened or endangered species and other forms of marine life.[87]

[87] Sands, 2003. UNCLOS Arts. 194 (1) and (5).

The assembly of the International Seabed Authority (the Authority) defines the term marine environment,

> *"marine environment" includes the physical, chemical, geological and biological components, conditions and factors which interact and determine the productivity, state, condition and quality of the marine ecosystem, the waters of the seas and oceans and the airspace above those waters, as well as the seabed and ocean floor and subsoil thereof;*[88]

Neither an interpretation of the relevant Articles of UNCLOS, nor the decision from the assembly of the Authority, separates between the marine environment and the flora and fauna that it supports. However, this is something that the Convention for the protection of the marine environment of the North-East Atlantic (OSPAR Convention) does. The preamble to the OSPAR Convention views the environment and the living resources therein separately. This implies that the term *marine environment* when used in UNLCOS shall be understood to cover both the environment, and the flora and fauna that it supports.

As stated above, all biological material containing functional units of heredity is for the purpose of this thesis considered as marine genetic resources. The term *marine environment*, which both includes biological components and marine life as shown above, conclusively also cover marine genetic resources.

Furthermore, Article 145 calls on flag states to take necessary measures with respect to the *activities of the Area* to ensure protection of the marine environment. The rights and duties of flag states in the Area are regulated thoroughly in relation to minerals.[89] While no similar regulation exists in relation to marine genetic resources or bioprospecting, the mineral exploring or exploiting state is amongst others under the obligation to append an assessment of the potential environmental impacts to the application to mine in the Area.[90]

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[88] ISBA/6/A/18. Part I, Regulation 1, Article 3 (c).

[89] For further readings see: Lodge, M.W. 2003., pp. 49-59.

[90] ISBA/6/A/18, annex, Article 21 (4).

This implies that the marine genetic resources does not enjoy protection in itself through this provision, the resources only appreciate protection when in relation to *activities* that are covered, such as exploration for polymetallic nodules.

In conclusion, the commercial utilization of marine genetic resources in the Area appear not to be regulated. Regarding the conservation of marine genetic resources, these appear only to be afforded protection from harmful effects that may arise from the activities related to mineral resources in the Area under UNCLOS.

4.2 Conservation of marine genetic resources on the high seas

Genetic diversity is of value to bioprospectors, as discussed earlier. A diversity of genetic material and the conservation of marine genetic resources is thereby important to bioprospecting. As marine genetic resources are found within all potentially or actually valuable genetic material containing functional units of heredity, the conservation of marine genetic resources can be seen to imply the conservation of genetic diversity and thereby all marine life. It is, however, the regulation of flag states with respect to the conservation of marine genetic resources that now will be discussed and clarified. UNCLOS Part VII, Section 2, covers the conservation and management of living resources on the high seas. As marine genetic resources are considered as an inherent part of, or included in, *living resources*, as discussed above, Part VII, Section 2 of UNCLOS will be discussed.

To begin with, whether, how and to what extent the different provisions of Section 2 regulate the conservation of marine genetic resources will be discussed. Thereafter, Part XII of UNCLOS covering the protection and preservation of the marine environment will be discussed.

4.2.1 Conservation of the living resources on the high seas

Five provisions on conservation and management of the living resources of the high seas are found in Part VII, Section 2 of UNCLOS. These are Articles 116 to 120. Article 116 is

however limited to exclusively deal with the *Right to fish on the high seas* and is not relevant in relation to conservation of marine genetic resources.

Article 120 is also limited in its scope and deals with marine mammals. Within the EEZ UNCLOS Article 65 regulates marine mammals. Furthermore UNCLOS Article 120 states that Article 65

> *... also applies to the conservation and management of marine mammals in the high seas.*

An international organisation, the International Whaling Commission, is through Article 65 authorized with the competence to regulate whaling in a more restrictive way than Part V of UNCLOS asks for. The International Convention for the Regulation of Whaling (ICRW), to which all the relevant whaling nations such as Japan, Iceland and Norway in addition to many other countries with an interest are parties, has regulated whaling further. The scope of the convention applies to all waters in which the parties prosecute whaling, including the high seas.[91] UNCLOS Article 65 moreover tells the parties to cooperate through an international organisation for the

> *... conservation, management and study (of whales(added)).*

The issues of conservation and bioprospecting of whales will therefore not be discussed because it must be seen as being covered by a special legal regime.

UNCLOS Articles 117, 118 and 119 determine that states are under a general obligation to cooperate and decide on measures necessary for the conservation of living resources.

[91] ICRW Article 1 (2).

Article 117 focuses on the conservation of living resources. The provision stands out because it uses the word *duty* and thereby reflects the fact that there exists a duty to take necessary measures. The provision does not imply a loose objective, but a specific legal obligation[92] and states that

All States have the duty to take, or to cooperate with other States in taking, such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas.[93]

It can be understood through an ordinary understanding of this provision that it decides, also in relation to marine genetic resources as discussed earlier, that all flag states have a duty to take the necessary conservation measures for their respective nationals or to cooperate with other states to that end. As it is the flag state that decides in the first instance whether a measure is necessary in relation to Article 117, flag states can use their discretion in this regard. The scope of flag states' discretion is however not clearly defined. This might constitute a challenge in relation to the conservation of marine genetic resources because of the low level of knowledge and information that exists about these resources and marine genetic diversity.[94]

Australia and New Zealand claimed for example that Japan had breached UNCLOS Article 117 in the Southern Bluefin Tuna Cases because Japan had been

... failing to adopt necessary conservation measures for its nationals fishing on the high seas so as to maintain or restore the SBT (Southern Bluefin Tuna (added)) stock ... contrary to the obligation in Article 117 to take necessary conservation measures for its nationals;

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[92] Orrego Vicuña, F. 1999, p. 46.

[93] UNCLOS Article 117.

[94] UN A/59/62/Add.1 Para. 169.

In this instance the tribunal, the International tribunal for the law of the sea (ITLOS), with dissenting votes decided by 21 votes to 1, that

(e) Australia, Japan and New Zealand should resume negotiations without delay with a view to reaching agreement on measures for the conservation and management of Southern Bluefin Tuna;

This statement does not show explicitly what states' discretionary competence implies between a flag state and its nationals. The court could have decided that Japan had breached Article 117, but it did not do so. The court did, however, decide that the parties had not sufficiently cooperated. The duty to cooperate is a fundamental principle in UNCLOS and Judge Wolfrum stated in his separate opinion in the MOX Case that

... the obligation to cooperate is the overriding principle of international environmental law ...

The duty to cooperate is also found in several other international agreements and declarations such as in Principle 24 of the Stockholm Declaration, Principle 27 of the Rio Declaration and Article 5 of the CBD. On this basis it can be stated that the duty to cooperate has a central role in international law.

It can be concluded that there exists a duty for flag states to cooperate in general and that UNCLOS decides that this duty also shall implicitly cover the conservation of living resources as well. As the term *living resources* cover marine genetic resources, UNCLOS Article 117 also implies a duty to cooperate in taking necessary conservation measures for their respective nationals in relation to marine genetic resources.

Cooperation relies on a degree of good will and a spirit of adjustment that is not always available among highly competitive entities. The commercial utilization of marine genetic resources pursued by professionals usually implies economic competition, and the needed

good will is therefore not necessarily present. It has in relation to cooperation in fisheries matters been stated that

> *This cooperative approach has been one of the important flaws in the historical experience of international law in the matter.*[95]

Even if this statement is meant to explain cooperation in relation to fisheries, states do not have clear legal incentives through legislation to cooperate in good will and in a more responsible manner in relation to the conservation of marine genetic resources than what has been proven in relation to fishing. It was therefore, in relation to fishing, made an implementing agreement for cooperation through regional fisheries management organisations, named the United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA). The UNFSA is a global agreement relating to the conservation and management of straddling and highly migratory fish stocks.[96] In light of what was required to force cooperation on fishing states, it is difficult to find evidence for that simply the duty to cooperate as called for in UNCLOS Article 117 alone will be sufficient in order to preserve genetic material and genetic diversity on the high seas.

In conclusion, UNCLOS Article 117 is general in wording[97] and it is difficult to argue that a single flag state has specific duty to establish conservation measures in relation to marine genetic diversity for bioprospectors flying their flags, based on this provision and combined with the low level of knowledge that exists about marine genetic material. The *duty* to cooperate in taking necessary conservation measures for their nationals does, however, establish a possible foundation upon which flag states could develop new regulations. It

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[95] Orrego Vicuña, F. 1999, p. 48.

[96] See Henriksen, T., G. Hønneland, and A. Sydnes, 2006, for a thorough analysis.

[97] Brownlie, I. 2003, p. 253.

can be concluded that Article 117 regulates marine genetic resources, but that the regulation is unclear and general in nature in relation to marine genetic resources.

UNCLOS Article 118 focuses on promoting cooperation in general in relation to the conservation of living resources. The provision also promotes the establishment of regional fisheries management organisations to manage and conserve the living resources. The UNFSA has now implemented the provisions of UNCLOS relating to the conservation and management of straddling fish stocks and highly migratory fish stocks. Neither the mandate nor scope of these regional management organisations nor the UNFSA includes marine genetic resources. The first sentence of Article 118 states that

States shall cooperate with each other in the conservation and management of living resources in the areas of the high seas.

The sentence does establish a general obligation for flag states to cooperate in the conservation of living resources, and thereby also marine genetic resources. However, this sentence must be read against the backdrop of the rest of the provision that deals with cooperation for the purpose of conservation in relation to exploitation of living resources. The provision is furthermore primarily focused on the exploitation of living resources and conservation of the exploited species, something that decreases its relevance in relation to marine genetic resources and genetic diversity.

In conclusion, the relevance in relation to marine genetic resources of Article 118 is limited by its focus on exploited species and the provision does not establish a clear and specific legal obligation in relation to the conservation of marine genetic resources.

UNCLOS Article 119 elaborates on rules regarding conservation measures, primarily focusing on species and fishing. Article 119 also decides that the effects of harvesting on associated stocks shall be taken into consideration by the relevant flag states. This provision cannot be said, however, to imply a full ecosystem approach to marine

management. The need to apply an ecosystem approach to management of all marine resources is also reflected in several UN documents and international agreements.[98] An ecosystem can be described as

> *... a unit of ecology . . . which includes the plants and animals occurring together plus that part of their environment over which they have an influence.*[99]

This means that the whole system, including the marine genetic resources therein, is seen as one unit. Essentially, the ecosystem approach to marine management requires consideration of whole ecosystems at a scale that ensures that ecosystem integrity is maintained.[100] It is then the human effects on the ecosystem that shall be managed and not the ecosystem itself. An ecosystem approach is important in relation to marine genetic resources because of the connection between ecosystems, species and genetic diversity.

UNCLOS Article 119 is primarily aimed at regulating fish stocks that are being targeted and harvested, and not at all organisms that are part of the same ecosystem, and it is thus less relevant in relation to marine genetic resources. The regulation neither includes, nor is built upon, modern conservation methods such as the need to apply an ecosystem approach to marine management because of the complexity of marine genetic resources and genetic diversity.

4.2.2 Protection and preservation of the marine environment

UNCLOS Part XII focuses on the protection and preservation of the marine environment and can thereby also be relevant in relation to the conservation of marine genetic resources, given that marine genetic resources are part of the marine environment. The scope of this

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[98] Amongst others the UNFSA Article 5 (d) and (e), UN A/59/25 paragraph 58, UN A/60/31 paragraphs 4, 63, 64 and UN A/61/63 Chapter X.

[99] Compact Oxford English Dictionary, 1991, 2nd edition.

[100] Greenpeace International, 2007.

Part of UNCLOS, whether it also applies to the conservation of marine genetic resources, and therefore also in defining the scope of this thesis, will now be discussed.

Based on the focus of the provisions in UNCLOS Part XII, a distinction can be made between the prevention, reduction and control of marine pollution *and* the conservation of marine living resources. Part XII of UNCLOS primarily deals with pollution. Judicial theory that discusses the provisions in this Part often also uses the heading *Pollution* or similar.[101] This can mean that this Part of UNCLOS is not relevant within the scope of this thesis, as it will not cover pollution related issues.

The general obligation in Article 192, and the duty to cooperate that can be found in Article 197 can, however, be understood to have a broader scope than being limited to pollution, as they do not use the term *pollution*. The focus of these provisions is the protection of the marine environment.

However, when the different provisions of Part XII establish rights and duties for flag states, they do so primarily in connection with pollution, and not in relation to conservation, as for example can be seen in Articles 194 to 196 and 198 to 201. This implies that the rules that give effect and specify the general obligations in Articles 192 and 197 are primarily focused on pollution. From this it can be deduced that the intention of Articles 192 and 197 are to cover the protection of the environment with respect to pollution.

It can therefore be said that the provisions of Part XII can be relevant in relation to the protection of marine genetic resources from pollution. This means that when the focus of this thesis is directed towards conservation, and not the prevention of pollution, the provisions found in Part XII fall outside the scope of this thesis.

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[101] Shaw, M.N. 2003, p. 553, Brownlie, I. 2003, pp. 239-240 and Churchill, R.R. and A.V. Lowe. 1999, Chapter 15, p. 338.

4.3 Bioprospecting on the high seas

The high seas are regulated in accord with the doctrine of freedom of the seas and exclusive flag state jurisdiction.[102] Six freedoms are mentioned specifically in Article 87, whereas the first four of the six mentioned below, also exist in the 1958 High Seas Convention Article 2; freedom of navigation, freedom of fishing, freedom to lay submarine cables and pipelines, freedom of over flight, freedom of scientific research and freedom to construct artificial islands and other installations. These are rights afforded to flag states not organisations, even if it is the organisations that are the actual bioprospectors. This implies that flag states enjoy the freedom to, for example, do scientific research and that no other state or international institution may regulate its organisations activities without its consent.

On the basis of the abovementioned list, it can be concluded that it is the activities that are regulated and not the resources themselves. It is thus the activity of bioprospecting that is relevant and not the marine genetic resources themselves. Of the freedoms listed, the one most relevant in relation to bioprospecting is the *freedom of scientific research* because of the many similarities between the two activities. This category will therefore be discussed below. However, the question that will be raised first is whether there exists a *freedom of bioprospecting* that is not explicitly mentioned in Article 87.

4.3.1 A freedom of bioprospecting?

The list of freedoms of the seas presented in UNCLOS Article 87 is not exhaustive. The first paragraph of the Article states that the rights

> *... comprises,* ***inter alia*** *... freedom of... (emphasis added)*

This Latin expression can be understood as *amongst others*, and that there might therefore exist other freedoms of the seas. Marine bioprospecting is, however, not mentioned specifically as a freedom of the seas right in international law through any agreement. The

[102] UNCLOS Articles 86, 87 (1) and 92 (1).

question that arises then is whether bioprospecting in itself is a freedom of the seas right in international customary law.

If an activity has been practised for a long period of time, this can be an element reflecting the existence of an international custom. Bioprospecting on the high seas has been practised for a relatively short period of time relative to other marine activities, something that could then be argued in the direction of lacking in the consistency and generality of a practice. However, the time element is not in itself emphasized by the International Court of Justice and this argument does not rule out the existence of the freedom of the seas right to perform bioprospecting as an international custom.[103]

States have furthermore not reacted and openly protested to the practise of conducting marine bioprospecting in areas beyond the limits of national jurisdiction, something that can imply that it is an accepted activity. However, the fact that states have not reacted does not mean in itself that bioprospecting is an accepted freedom of the seas right.

Consistency and uniformity of a practise are important elements in proving the existence of an international custom. Practise can, in this regard, be understood as uniformity in procedural methods and consistency as to how bioprospecting shall be performed. Such uniformity is at least not obvious in relation to bioprospecting as there are no internationally accepted, non-binding guidelines or such that describe or define the practise. The act of treating bioprospecting as an activity, different from marine scientific research, has also been contested.[104] Documents do, however, exist that explain what bioprospecting is and its relation to marine scientific research.[105] The existence of evidence of a general practice accepted as law by states, *opinio juris*, in relation to general principles governing how bioprospecting on the high seas shall be practised, is not clearly visible. This could mean that it is a practise that is performed by some flag states without a clear regime. As

[103] Brownlie, I. 2003, p. 7.

[104] UN A/62/169 paragraph 54.

[105] Arico, S. and C. Salpin, 2005, pp. 15-16 and UN A/62/66 paragraphs 150 to 154.

most activities taking place on the high seas are regulated to some extent, this argument does not favour the existence of an established international custom on the basis of a lack of a general conduct or guidelines.

The freedom of scientific research is, as will be shown in the following section of this thesis, subject to regulations. It would then be irregular if bioprospecting, which is a similar practise, were accepted as founded on an international custom without similar limitations, right and duties for flag states under the freedom of the seas system. The similarities between bioprospecting and marine scientific research also creates difficulties in this respect, as there is no legally recognized definition of either of the terms.

In conclusion, bioprospecting can probably not be seen as a freedom of the seas right due to the lack of known uniformity and consistency of practise. However, as there is no known conflict with regards to whether bioprospecting is recognized as a freedom of the seas right the existence of bioprospecting as such a right is difficult to either prove or negate. As there is no clear evidence of whether bioprospecting is a freedom of the seas right in international customary law, the next chapter will discuss whether the freedom of scientific research regime regulates bioprospecting.

4.3.2 Freedom of scientific research

Scientific research on the high seas is regulated by article 87 (1)(f). The article lays out the primary rule, which states that all states enjoy the freedom of scientific research. This interest is subject to limitations. Marine scientific research can only be conducted subject to UNCLOS Part VI and Part XIII, and subject to Article 87 (2). Commercial utilization of marine genetic resources is not treated specifically under these parts and provisions.

Article 238 in UNCLOS is the main rule allowing all states and competent international organisations to conduct marine scientific research, subject to the limitations provided for

in UNCLOS.[106] Articles 256 and 257 make evident that this right also extends to the Area and to the high seas.

The question that arises is whether bioprospecting, or the activity related to the commercial utilization of marine genetic resources, falls under the regulatory regime of marine scientific research. If the activity of bioprospecting is seen as covered by these provisions, then it formalizes flag states rights and duties with regards to performing bioprospecting.

While marine scientific research is often viewed as more academic or purer research than bioprospecting, UNCLOS does not hold a definition of the term. It has been suggested that marine scientific research under UNCLOS encompasses both the study of the marine environment and its resources with a view to increasing humankind's knowledge, which can be called pure or fundamental research, and research for the subsequent exploitation of resources that can be called applied research.[107] Applied research can be explained as research for commercial purposes, rather than research for pure knowledge gathering or learning. This distinction between marine scientific research as purer science and bioprospecting as applied science is relevant in relation to a possible need for a new regulatory regime for bioprospecting activities. Simply put, if bioprospecting clearly is covered by the regulations concerning marine scientific research, then there is no need for new regulation.

UNCLOS Article 246 can be interpreted as making a distinction between pure scientific research and applied science. The Article decides that a coastal state shall consent to grant permission to researchers that want to do scientific research in the EEZ or on the continental shelf within certain thresholds. One of these thresholds being if the research,

[106] UNCLOS Article 238.

[107] UN A/59/122 paragraph 92.

... is of direct significance for the exploration and exploitation of natural resources, whether living or non-living.[108]

An interpretation of this provision implies that a research application can be declined by the coastal state if the research is of direct significance for the commercial use of the natural resources. By doing this, it can be said that UNCLOS differentiates between research for pure scientific reasons and more commercially oriented exploration within the limits of national jurisdiction.[109] This differentiation does not apply in the Area or on the high seas, and does not therefore establish an argument ruling out applied research, and thereby bioprospecting, as being part of or included in the marine scientific research regime.

In order to discuss bioprospecting and marine scientific research in conjunction and to see whether the regulation of marine scientific research covers bioprospecting activities, the scope of marine scientific research needs to be clarified. The phrase *marine scientific research* will now be discussed in order to seek out its scope.

4.3.3 The phrase marine scientific research

An image of what the phrase *marine scientific research* covers can be found, despite no clear definition in UNCLOS, by looking at the relevant provisions of Part XIII titled *marine scientific research* in the Convention.[110] It is clear that the phrase in relation to UNCLOS includes research exclusively for peaceful purposes.[111] Additionally, Article 241 states that marine scientific research shall not constitute the legal basis for any claim to oceanic parts or resources. This may create difficulties in relation to intellectual property law and patents on marine genetic resources, something that will not be discussed as it falls outside the scope of this thesis. It can be said that the provision clearly hinders states from

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[108] UNCLOS Article 246 (5) (a).

[109] Churchill, R.R. and A.V. Lowe. 1999, p. 404.

[110] UN A/62/169 paragraph 54.

[111] UNCLOS Article 240 (a).

claiming the right to species or a part of the environment by the way of marine scientific research solely.

The research shall also be carried out with appropriate scientific methods.[112] The ordinary understanding of the phrase implies that the research must be executed in an objective way to hinder or reduce a biased interpretation of the results. Other criteria generally applied to scientific research are to document, archive and share all data and methodology so it is available for scrutiny by other scientists. This gives other scientists the opportunity to try to reproduce the results in order to verify them.

Article 240 *litra* d states that marine scientific research shall be conducted in compliance with the provisions on conservation and preservation of the marine environment in UNCLOS, such as the general obligations in Articles 117 and 192. Neither shall marine scientific research interfere with other legitimate uses of the sea.[113]

None of the elements discussed above, while exploring the scope of the phrase *marine scientific research*, totally exclude the possibility that the use of the phrase also encompasses bioprospecting activities. In relation to Article 240, it can be discussed whether full scrutiny will be possible in relation to bioprospecting, keeping trade secrets in mind. However, this is not a general excluding obstacle in this regard. When a sample of biological material is taken from the sea, there is no obvious difference between marine scientific research and bioprospecting. It is the motivation and objective that the bioprospecting organisations have that is different.

On the basis that marine scientific research does not exclude research for commercial purposes, bioprospecting can be seen as being covered by the regulation of marine scientific research. The commercial element is, however, a central part of bioprospecting. UNCLOS regulation of the commercial utilization of marine genetic resources, and thereby

[112] UNCLOS Article 240 (b).

[113] UNCLOS Article 240 (c).

bioprospecting, will therefore now be discussed focusing solely on the commercial element.

4.3.4 The commercial element of bioprospecting

Under UNCLOS, flag states are afforded certain rights and obligations in relation to marine scientific research on the high seas and in the Area. When applying the premise that bioprospecting is covered by the rules regulating marine scientific research in UNCLOS, it needs to be considered whether this regulation is sufficient to also cover the commercial aspect of bioprospecting that differentiates it from marine scientific research. The distinctive commercial aspects that arise as a consequence of the commercial element entailed in bioprospecting and that are relevant will now be treated.

Whereas several provisions in UNCLOS indirectly regulate the benefits arising out of research on marine genetic resources, such as the obligation to promote the development of marine scientific research and technological capacity of developing states, none regulate the benefits arising from the commercial utilization specifically.[114] There is for example no obligatory benefit sharing system, as can be found in relation to mineral exploitation in the Area.[115] A benefit sharing system in relation to marine genetic resources would imply the fair and equitable sharing of the benefits arising out of the commercial utilization of genetic resources.[116]

The justification for a benefit sharing system can be observed when looking at the states and organisations that are performing marine bioprospecting and the situation of developing countries in this. Only a few states and organisations possess the technological and financial means to investigate and utilize these resources. As a result, only a few organisations can claim rights to the genetic information found and then effectively keep developing countries and their organisations out of this market. Establishing a benefit

[114] UNCLOS Article 266 (2).

[115] UNCLOS Annex III Article 13.

[116] CBD Article 1.

sharing system could help prevent this effect by providing more states with the opportunity to utilize the resources.

This special situation of developing countries has been acknowledged. UNCLOS specifically recognizes the interests and needs of developing countries in its preamble, Part XIV, and throughout provisions dealing with the regulation of activities in the Area. Based on this recognized interest under the law of the sea one would assumed that bioprospecting in areas beyond national jurisdiction, where developing countries have a special position, would be regulated in compliance with these recognized interests. Marine scientific research is, however, not regulating this aspect of bioprospecting.

Drawing attention to the development of UNCLOS and the level of scientific knowledge that existed in relation to marine genetic resources during that time, it seems obvious that the lawmakers of UNCLOS could not foresee the negative and unintentional effects arising from not regulating the commercial utilization of marine genetic resources. Based on the principle of sovereignty as a starting point, parties to an international agreement cannot assume to be bound by more than what they have actually agreed on. The fact that the terms *marine genetic resources* or *bioprospecting* were unknown when UNCLOS was developed supports the reasoning that marine scientific research does not cover the commercial elements of bioprospecting.

Based on the unfavourable situation developing countries have and that it can be argued that UNCLOS was not developed to deal with the commercial utilization of marine genetic resources, and one is drawn towards the conclusion that the regulation of marine scientific research is not sufficient to also cover the commercial aspects of bioprospecting. It can be argued that existing regulations on marine scientific research are not sufficient to be applied on bioprospecting and there therefore exists a legal gap.[117]

[117] UN A/61/65 paragraphs 29 and 30.

5 An unfinished science

Law is an unfinished science and its nature implies that new or changing issues will always need to be clarified or regulated. As shown in the previous chapters, the commercial utilization and conservation of marine genetic resources in areas beyond the limits of national jurisdiction is not sufficiently regulated or clarified. On this basis it can be deduced that there is a need for new regulations, provided that this is wanted by states.

This chapter will therefore present views on whether new regulations are wanted.

5.1 Are new regulations wanted?

Richer developed countries will benefit greatly by not regulating bioprospecting or the possible sharing of benefits arising out of the utilization of marine genetic resources. Developing countries in general do not have the financial and technical capacities needed to utilize marine genetic resources, resulting in less competitive ability.[118] The leading biotechnology organisations in countries such as the USA, Canada and the European Union will be the beneficiaries of non-regulation, in practise closing the market to countries that do not have the necessary capacities.[119] Whether new regulation is wanted among states, however, is not only dependent of social justice.

The United States have argued that new regulation will stall or hold back their ability to do research, and that the new products such as better medicines coming out of bioprospecting *are* the benefits, together with greater knowledge and enhancement of the global understanding of the biogeography and taxonomy of deep sea marine biodiversity.[120] In this regard, Iceland and the United States argue that the UNCLOS high seas regime covers marine genetic resources sufficiently and that no new regulation is needed.[121]

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[118] Rosendal, K.G. 2000, p. 4, and UN A/62/169 paragraphs 100 and 101.

[119] Arico, S. and C. Salpin, 2005, p. 25.

[120] UN A/62/169 paragraph 32.

[121] UN A/61/65 paragraph 30.

Marine genetic resources represent a new kind of resources, as the valuable genetic information captured constitutes the resource. In comparison with marine scientific research, bioprospecting implies a commercial element. The commercial element is new, and has grown out of technological evolution and a commercialization of modern society. As businesses and states have the financial opportunity, they are now focusing increasingly on resources that were previously unreachable.[122] The commercial element of the activity has also changed the interests in the resource because of the profitable opportunities that are connected with it. These elements have triggered a demand from several states, including the large G-77, to recognize and regulate the Area and all its resources, including marine genetic resources, as the common heritage of humankind.[123] The concept of common heritage of humankind, which in chapter six will be elaborated further, implies in short that the areas and resources regulated in line with this concept shall be utilized for the benefit of humankind as a whole. The United States, however, opposes the assumption that the living resources are part of the common heritage of humankind, and can in this respect be said to have the status of persistent objectors.[124]

Other states have argued that there should be an equitable sharing of the resources from the sea in areas beyond national jurisdiction where the special situation of developing countries and small island states are taken into consideration.[125] The European Union, for example, has stated that UNCLOS does not cover marine genetic resources in areas beyond national jurisdiction and that these resources are currently unregulated.[126]

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[122] Arico, S. and C. Salpin, 2005, p. 27.

[123] UN A/62/169 paragraph 71.

[124] Brownlie, I. 2003, p. 244 and Churchill, R.R. and A.V. Lowe. 1999, pp. 226-228.

[125] UN A/62/169 paragraph 102.

[126] Statement by Germany on behalf of the European Union during the eighth meeting of the United Nations Open-ended Informal Consultative Process held at United Nations Headquarters from 25 to 29 June 2007 and reflected in UN A/62/169 paragraph 100.

Whereas some nations such as the United States and Iceland do not see the need for new regulations, it can be concluded that the European Union recognize that the issues are unregulated and that a third group of states, the G-77, recognize the need for and want new regulations. As a consequence of the fact that some nations want to regulate the issues, one selected regulatory option will be presented in chapter six.

6 Addressing the legal gap

The remainder of this thesis will first present attempts on legal justification for including the common heritage of humankind doctrine and a benefit sharing mechanism in new legislation. Thereafter a selected regulatory option to address the legal gap will be discussed.

6.1 Open Access versus Common Heritage of Humankind

Common heritage of humankind can be explained to contain three basic elements.[127] These three elements are; an area reserved exclusively for peaceful purposes, and that both the exploration and the exploitation of the areas resources shall be carried out for the benefit of humankind as a whole and thereby unsusceptible to unilateral appropriation.

The alternative to the idea of common heritage of humankind is the idea of open access where the resources are res nullius. This latter idea is practised in a manner where states acting outside national jurisdiction can operate as they please, free and unrestricted, subject to general conditions. In relation to marine genetic resources, it implies that they are regarded as ownerless property and are thereby eligible for exclusive rights.[128] UNCLOS Article 136 is limited to granting the Area with its mineral resources the status of common

[127] Common Heritage of Humankind is also known as Res Communis and Common Heritage of Mankind.

[128] Tvedt, M.W., 2005, p. 315.

heritage of humankind, and does thereby not reach to also cover marine genetic resources. Marine genetic resources are therefore effectively under an open access system.[129]

When naval powers emerged, the oceans became the new battleground both militarily and commercially, and this ignited a fight over the rights of navigation and resources. The commercial utilization of marine genetic resources can be seen in this context as a natural development. Hugo Grotius published in his book De Indis a chapter called Mare Liberum also called the Right Which Belongs to the Dutch to take part in the East Indian Trade.[130] Here he formulated a principle that articulated that the sea was international territory and that all nations were free to use it for seafaring trade, the freedom of the seas doctrine. He thereby provided fitting ideological justification for the Dutch to break up trade monopolies through its formidable naval power. This doctrine has influenced the law of the sea to a great extent, which for example can be seen in UNCLOS Part VII, titled the High Seas.

This short historic lesson shows that it was trade and not fisheries or marine genetic resources that were the primary focus of Grotius' freedom of the seas doctrine.

Even if some categories of resources in areas beyond national jurisdiction have been regulated in line with this doctrine, the freedom of the seas doctrine does not need to be applied to also cover all other resources in areas beyond national jurisdiction. The minerals found in the Area are regulated as the common heritage of humankind through the preamble and Article 136 of UNCLOS, which contributes to this notion.[131] Additionally, the G-77 see the UN General Assembly Declaration on Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction 2749 (XXV) signed December 17, 1970 as support for this view.

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[129] Statement by Germany on behalf of the European Union during the eighth meeting of the United Nations Open-ended Informal Consultative Process held at United Nations Headquarters from 25 to 29 June 2007.

[130] Grotius, H. 1609. De Indis (Mare Liberum).

[131] For further readings see: Mahmoudi, S. 1987.

Based on the fact that specific areas and resources previously have been regulated as the common heritage of humankind under UNCLOS, held together with marine genetic resources as a relatively new and special kind of resource, these resources in areas beyond national jurisdiction could be regulated as the common heritage of humankind. The selected regulatory option presented beneath will be based on this doctrine.

6.2 Sharing the results

The economic goals of trade liberalization and environmental policy are the same … both policy interventions ultimately aim to promote structural economic change.[132]

The aim of a benefit sharing policy and mechanism covering the commercial utilization of marine genetic resources would be to promote and facilitate marine scientific research and product development in developing countries in order to push for structural economic change. A benefit sharing mechanism in relation to the commercial utilization of marine genetic resources would imply that the results arising from the *utilization* would be shared. UNCLOS Article 239 states that

> *States and competent international organisations shall promote and facilitate the development and conduct of marine scientific research in accordance with this Convention.*

By recognizing that the content of this provision also is relevant in relation to bioprospecting, and read with the backdrop of the preamble of UNCLOS, with focus on the situation of developing nations and land-locked states, the referred provision asks to promote and facilitate the development of marine scientific research in the interests of developing countries. This implies for example that states are encouraged to assist developing nations in their conduct of marine scientific research. Article 239 is, however, a general provision that does not set up specific obligations and that does not contain a right for developing countries to claim assistance in a specific situation. One way of giving effect to these elements of UNCLOS is to aid states, which are in a financial and

[132] Moltke, K.v. 1997. p. 247.

technological difficult position, by including a benefit sharing mechanism when regulating the commercial utilization of marine genetic resources.

A benefit sharing mechanism can also be justified by focusing on the common heritage of humankind doctrine and the fact that the resources can be seen as belonging to all. However, a benefit sharing mechanism does not need to be built upon the doctrine of common heritage of humankind. Benefit sharing can also be based on international agreements. Each of the parties to such an agreement could then implement legislation in national legislation, demanding a tax or other compensation from the bioprospectors, which could then be distributed in order to achieve the aim of a benefit sharing policy as stated above.

The discussions on the selected regulatory possibility presented beneath will consequently also imply a benefit sharing mechanism.

6.3 Presentation of a regulatory option

There are various possible options to address the regulation of the commercial utilization and conservation of marine genetic resources within a common heritage of humankind regime with a benefit sharing mechanism. These non-mutually exclusive options include *amongst others*: using regional frameworks, the adoption of guidelines, complemented by a voluntary code of conduct, using the framework of the CBD, bringing deep seabed genetic resources within the regime of the Area and adopting a new implementing agreement under UNCLOS.

The selected option that will be presented here is a mix of bringing deep seabed genetic resources within the regime of the Area and adopting a new implementing agreement under UNCLOS. This option is chosen for several reasons. Regulating the areas beyond national jurisdiction as the common heritage of humankind would most likely require a global mechanism something that excludes a regional approach. This option is also based upon UNCLOS, as opposed to the CBD, as states have stated that UNCLOS is the main framework for these issues, as described in chapter 2.1. The reason why guidelines or

voluntary code solutions will not be treated is the fact that it would be difficult to apply the common heritage of humankind doctrine to such arrangements that are non-binding. Such agreements could, however, be seen as a first step in relation to the conservation of marine genetic resources, as they are voluntary, based on the level of disagreement that exist among states towards the issue.

6.3.1 A new implementing agreement under the scope of UNCLOS

A new implementing agreement under the scope of UNCLOS is an option that has been proposed and discussed by non-governmental organisations and states.[133] The agreement could implement the relevant articles discussed in chapter 4 of this thesis, and thereby regulate the conservation and commercial utilization of marine genetic resources within a common heritage of humankind regime with a benefit sharing mechanism, and be managed by the Authority. The UNFSA and the Agreement relating to the implementation of Part XI of UNCLOS are agreements that previously have implemented Articles of UNCLOS.

The UNFSA was called for by Agenda 21, the programme of action adopted at the 1992 UN Conference on Environment and Development, was signed in 1995 and entered into force December 2001. This implies that any new agreement could involve a lengthy process.[134] However, the UNFSA has already been developed and can be said to have prepared the ground for a future agreement in the context of living resources under UNCLOS, and states have already acknowledged UNCLOS as the main convention regulating activities related to marine life beyond national jurisdiction.

When a completely new agreement is drafted, all the relevant issues will be discussed and increased knowledge would then be one of the indirect effects of the process. This can also lead to a spill over effect in relation to the regulation of the relevant issues under national law.

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[133] UN A/61/65 paragraphs 29 and 55 and UN A/62/169 paragraphs 72 and 89.

[134] UN A/61/65 paragraph 55.

The relevant areas and marine genetic resources therein could also be regulated as the common heritage of humankind under a new global implementing agreement. To extend the claim to regulate all marine life limited to the seabed, or in general, as the common heritage of humankind would probably be difficult to achieve as a result of different states' attitudes towards the issue, as explained earlier. Regulating marine genetic resources as the common heritage of humankind would imply that the concept of public property rights *could* be applied, meaning

> *... that the public's right to access and use these goods is inalienable and cannot be delimited or expropriated into a private exclusive right.*[135]

This concept is based on the notion that certain aspects of the nature should not be included under the private rights of private persons.[136] One negative effect from such a system could be that businesses could have difficulties in protecting their investment and that this would lead to less research and fewer new products. However, the positive spill over effects from such a system include the right of all to utilize a specific genetic resource, something that could build capacity and promote information sharing with developing countries and thereby constitute a more equitable system promoting social economic change.

A common heritage of humankind regime in relation to marine genetic resources regulated under a new implementing agreement could, on the other hand, be limited to arranging for the sharing of benefits arising from the commercial utilization of marine genetic resources. Such a system could imply the direct sharing of monetary benefits, access to the developed products at a lower price, or access to capacity building.

The Authority can be seen as relevant in relation to being an institution managing a new treaty. Early in the negotiations of UNCLOS, it was also discussed whether high seas

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[135] Tvedt, M.W. 2005. p. 315.

[136] Tvedt, M.W. 2005. p. 315.

fisheries should be managed internationally, with some suggesting that the Authority should deal with this task.[137] These proposals were however never adopted.

The Authority constitutes a mechanism in parts of the relevant area, meaning the minerals on the seabed. Consequently this means that the mandate of the Authority would have to be expanded to arrange for the management of the water column and a whole set of new resources under a new implementing agreement. Furthermore, many other practical, administrative and legal changes and amendments would create challenges if the Authority were to deal with this matter. The institution would have to go through substantial development and it is not obvious that such a solution would minimize costs or function better than creating a new institution.

Even when UNCLOS was finalized there was still not concurrence in relation to the Authority and its role. The disagreement in relation to the governance of the Area led to the fact that many nations did not sign UNCLOS. To get more states in on the convention, an implementing agreement was made; the Agreement Relating to the Implementation of Part XI of UNCLOS. When the aim was to get more states to ratify UNCLOS, the implementing agreement was a success.[138] UNCLOS came into force November 16, 1994.

There would therefore most likely be resistance against opening up the regulation of the Area to new discussions because of the long negotiation history and disagreements among states on consenting to the role of the Authority in relation to its management of the Area with its mineral resources. On the premise that a new implementing agreement could be developed without changes being made to the current legal situation for the Area with its mineral resources, to go through the Authority could be a possible road, if the aim was to create a new regime for the conservation and commercial utilization of marine genetic resources.

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[137] The Law of the Sea: The regime for high seas fisheries. 1992, p. 7.

[138] As of 25 October 2007 131 states have ratified the implementing agreement.

Furthermore, the Authority is an appropriate institution because of the lack of other existing suitable institutions. Since the Area with its mineral resources is already regulated as the common heritage of humankind, it would only imply an extension to the issues that the Authority is already managing. It is moreover also administrating a benefit sharing mechanism in relation to minerals and the Authority presumably has the experience in this matter, keeping the different nature of mineral and genetic resources in mind.

It can also be seen as positive if both living and non-living resources were under the scope of the same global institution. This institution could then manage both the mineral and marine genetic resources in the relevant areas with the positive management and administration effects, which that entailed.

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